LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An arrangement for controlling combustion in a combustion engine, ~~whereby~~ the combustion engine ~~(1) comprises~~ comprising:

a combustion chamber;

~~(3),~~ a movable piston ~~(4) adapted to~~ in the combustion chamber and movable in the chamber for compressing a fuel mixture in the combustion chamber ~~(3)~~ so that self-ignition of the fuel mixture takes place[[,]];

a crankshaft ~~(5)~~ driven to rotate by movements of the piston;

~~(4),~~ an inlet valve ~~(8)~~ to the combustion chamber ~~(3)~~ and an exhaust valve ~~(11)~~ from the combustion chamber; ~~(3), which arrangement comprises~~ a control unit operable for ~~(19) adapted to~~ controlling the self-ignition of the fuel mixture to an optimum crankshaft angle (cad_{iopt}) of the crankshaft within a load range (L_{tot}) of the engine, wherein the[[,]] ~~characterised in that said~~ load range (L_{tot}) can be divided into at least two subranges (L_I, L_{II});

~~and~~ the control unit ~~(19) is adapted to~~ being operable for controlling the self-ignition of the fuel mixture towards an optimum crankshaft angle (cad_{iopt}) within a first subrange (L_I), the control unit being operable to perform by ~~means of~~ a strategy (I) which ~~entails~~ supplies a variable amount of hot exhaust gases ~~being supplied~~ to or to be retained in the combustion chamber ~~(3)~~, and within a second subrange (L_{II}), and the control unit being operable to perform by ~~means of~~ another strategy (II) which ~~entails~~ varies the effective compression ratio (c) in the cylinder ~~(2) being varied~~.

2. (Currently Amended) An arrangement according to claim 1, ~~characterised in that~~ wherein the control unit ~~(19)~~ is ~~adapted~~ operable to ~~initiating~~ initiate exhaust valve closure (evc) and inlet valve opening (ivo) within the first subrange (L_I) ~~in such a way that~~ for retaining a variable amount of hot exhaust gases from a combustion process ~~is retained~~ in the combustion chamber ~~(3)~~.

3. (Currently Amended) An arrangement according to claim 2, wherein ~~characterised in that~~ the control unit ~~(19)~~ is ~~adapted~~ operable to ~~initiating~~ initiate inlet valve closure (ivc_{opt}) within the first subrange (L_I) ~~in such a way as to result in~~ for causing an optimum effective compression ratio in the cylinder ~~(2)~~.

4. (Currently Amended) An arrangement according to ~~any one of the foregoing claims, characterised in that~~ claim 1, wherein the control unit ~~(19)~~ is variable for ~~adapted to~~ varying the effective compression ratio in the cylinder ~~(2)~~ within the second subrange (L_{II}) by initiating inlet valve closure (ivc) at a variable crankshaft angle.

5. (Currently Amended) An arrangement according to claim 4, wherein ~~characterised in that~~ the control unit ~~(19)~~ is ~~adapted~~ operable to ~~initiating~~ initiate exhaust valve closure (evc_{opt}) and inlet valve opening (ivo_{opt}) within the second subrange (L_{II}) at crankshaft angles at which minimum fuel consumption is obtained.

6. (Currently Amended) An arrangement according to claim 1, further comprising ~~any one of the foregoing claims, characterised in that the arrangement comprises~~ at least one hydraulic control system ~~(18a, b)~~ for periodically lifting the inlet valve ~~(8)~~ and the exhaust valve ~~(11)~~.

7. (Currently Amended) An arrangement according to ~~any one of the foregoing claims, characterised in that the arrangement comprises~~ claim 1, further comprising a first sensor ~~(16)~~ for detecting a parameter (p) which indicates the start of a combustion process in the combustion chamber ~~(3)~~, and a second sensor ~~(17)~~ for estimating the crankshaft angle (cad) of the combustion engine ~~(1)~~, and the control unit ~~(19)~~ is adapted ~~to~~ for determining the crankshaft angle (cad_i) for the start of the combustion process.

8. (Currently Amended) An arrangement according to claim 5, ~~characterised in that said~~ wherein the sensor is a pressure sensor ~~(16)~~ which detects the pressure in the combustion chamber ~~(3)~~.

9. (Currently Amended) An arrangement according to claim 7, wherein ~~or 8, characterised in that~~ the control unit ~~(19) is adapted to~~ is operable for comparing the actual crankshaft angle (cad_i) at the self-ignition of the combustion process with stored information concerning the optimum crankshaft angle (cad_{iopt}) for self-ignition of the combustion process and for ~~to~~ using ~~that~~ the stored information for controlling the self-ignition of the following subsequent combustion process.

10. (Currently Amended) An arrangement according to ~~any one of the foregoing claims, characterised in that the arrangement comprises~~ claim 1, further comprising an inlet line ~~(7)~~ for air supply to the combustion chamber and an inlet nozzle ~~(10)~~ for fuel injection into the combustion chamber ~~(3)~~.

11. (Currently Amended) A method for controlling combustion in a combustion engine ~~whereby~~ wherein the combustion engine ~~(1)~~ comprises a combustion chamber ~~(3)~~, a movable piston ~~(4) adapted to~~ in the combustion chamber and movable in the chamber for compressing a fuel mixture in the combustion chamber ~~(3)~~ so that self-ignition of the fuel mixture takes place, a crankshaft ~~(5)~~ driven to rotate by movements of the piston; ~~(4),~~ an inlet valve ~~(8)~~ to the combustion chamber ~~(3)~~ and an exhaust valve ~~(11)~~ from the combustion chamber; ~~(3), which~~

the method ~~comprises the step of~~ comprising

controlling the self-ignition of the fuel mixture towards an optimum crankshaft angle (cad_{iopt}) within a load range (L), comprising ~~characterised by~~ the steps of dividing ~~said~~ the load range (L) into at least two subranges (L_I, L_{II}) and ~~of~~ controlling the self-ignition of the fuel mixture towards an optimum crankshaft angle (cad_{iopt}) within a first subrange (L_I) by ~~means of~~ a strategy (I) which ~~entails~~ supplies a variable amount of hot exhaust gases ~~being supplied~~ to or ~~retained~~ retains the hot exhaust

gases in the combustion chamber ~~(3)~~, and within a second subrange (L_{II}) by a ~~means of~~ second strategy (II) which varies ~~entails~~ the effective compression ratio (c) in the cylinder ~~(2) being varied~~.

12. (Currently Amended) A method according to claim 11, further comprising ~~characterised by the step of~~ initiating exhaust valve closure (evc) and inlet valve opening (ivo) within the first subrange (L_I) ~~in~~ such ~~a way~~ that a variable amount of hot exhaust gases from a combustion process is retained in the combustion chamber ~~(3)~~.

13. (Currently Amended) A method according to claim 12, further comprising ~~characterised by the step of~~ initiating inlet valve closure (ivc_{opt}) within the first subrange (L_I) ~~in such a way as~~ to result in an optimum effective compression ratio in the cylinder ~~(2)~~.

14. (Currently Amended) A method according to claim 12, wherein ~~any one of the claims 11-13 above, characterised by the step of varying~~ the effective compression ratio in the cylinder is varied ~~(2)~~ within the second subrange (L_{II}) by initiating inlet valve closure (ivc) at a variable crankshaft angle.

15. (Currently Amended) A method according to claim 14, further comprising ~~characterised by the step of~~ initiating the exhaust valve closure (evc_{opt}) and the inlet valve opening (ivo_{opt}) within the second subrange (L_{II}) at crankshaft angles which result in minimum fuel consumption.

16. (Currently Amended) A method according to claim 11, further comprising ~~any one of the claims 11-15 above, characterised by the step of~~ lifting the inlet valve ~~(8)~~ and the exhaust valve ~~(11)~~ by ~~means of~~ at least one hydraulic control system ~~(18a, b)~~.

17. (Currently Amended) A method according to claim 11, further comprising ~~any one of the claims 11-16 above, characterised by the steps of~~ detecting a parameter (p) which indicates the start of a combustion process in the combustion chamber ~~(3)~~, ~~of~~ estimating the crankshaft angle (cad) of the combustion engine ~~(1)~~, and ~~of~~ estimating the crankshaft angle (cad_i) at the start of the combustion process.

18. (Currently Amended) A method for according to claim 17, further comprising ~~characterised by the step of~~ detecting the pressure in the combustion chamber ~~(3)~~.

19. (Currently Amended) A method according to claim 17, further comprising ~~or 18, characterised by the steps of~~ comparing the actual crankshaft angle (cad_i) at the self-ignition of the combustion process with stored information concerning the optimum crankshaft angle (cad_{iopt}) for self-ignition of the combustion process, and ~~of~~ using that information for controlling the self-ignition of the following combustion process.

20. (Currently Amended) A method according to ~~any one of claims 11-19 above, characterised by the steps of~~ claim 11, further comprising supplying air to the combustion chamber via an inlet line ~~(7)~~ for injecting fuel into the combustion chamber ~~(3)~~ via an injection nozzle ~~(10)~~.